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ABSTRACT

The relation between Bayley Scale and Stanford-Binet measures in preschool and scholastic achievement at pre-adolescence is examined in the context of an early age intervention. The program sought to normalize the socio-cognitive development of disadvantaged 2-year-olds directly and through a training program for mothers. The follow-up includes a measure of parent-child interaction as an index of potential intervention influence on family processes. The effects of social class, culture and sex are also examined. Performance on various school subjects was predicted differentially by demographic factors, early test and intervention style measures. Correlational patterns were found to differ among experimental and control groups. Implications are drawn for family-oriented intervention and the interpretation of early cognitive test performance. A six-page list of bibliographical references is attached. (Author/JAZ)

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Interaction Style, Early Age Intervention and Intelligence Test Performance: A Longitudinal Assessment of their Relation to Scholastic Achievement

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Running Head: FAMILY INTERACTION AND TEST PERFORMANCE

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Abstract

The relation between Bayley Scale and Stanford-Binet measures in preschool and scholastic achievement at pre-adolescence is examined in the context of an early age intervention. The program sought to normalize the socio-cognitive development of disadvantaged two-year olds directly and through a training program for mothers. The follow-up includes a measure of parent-child interaction as an index of potential intervention influence on family processes. The effects of social class, culture and sex are also examined. Performance on various school subjects was predicted differentially by demographic factors, early test and intervention style measures. Correlational patterns were found to differ among experimental and control groups. Implications are drawn for family-oriented intervention and the interpretation of early cognitive test performance.

Interaction Style, Early Age Intervention and Intelligence Test Performance: A Longitudinal Assessment of their Relation to Scholastic Achievement

Early in the 1930's, the notion that early age intervention might prevent social problems and intellectual deficits began to receive attention (Wellman, 1932). Yet, as Clarke (1984) points out, evidence that children receiving early intervention would not maintain gains in I.Q. was available before a series of compensatory programs were launched in the late 1960's and 1970's. This well known "wash-out" effect is interesting, if only for the fact that it provides one of the few contexts where the predictive validity of I.Q. tests is jeopardized. It seems logical that the lack of stability of I.Q. of compensatory education participants may be accounted for by the shift of environments experienced. However if a decrease in I.Q. follows the termination of the relatively advantageous and normative environments provided by early age interventions, it may be that I.Q. instruments assess latent environmental contexts where learning occurs as well as individual learning ability. Where fluctuations in environment have occurred, these tests apparently have greater concurrent than predictive validity.

The notion that the cognitive environments to which children are exposed influence their intelligence and achievement test performance is not new (Hunt, 1961; Bloom, 1964; Hess and Shipman, 1969; Hall and Kaye, 1981). A host of intervention programs for the

disadvantaged have been implemented, predicated on the tenuous assumption that a "critical period" might exist in human intellectual development. The cumulative deficit hypothesis, founded on Bloom's (1964) alarming finding that early intelligence test performance was a strong determinant of intellectual performance at age seventeen gained considerable attention. Soon thereafter, two camps were formed that sought to explain the well documented "wash-out" effects of initially effective interventions. The first proposed that a genetic deficit was the cause of this phenomenon since black children score lower than white children in general and they were overrepresented in those evaluations. The second camp was quick to point out that children from various SES/ethnic groups differ in their socialization experiences that are, in turn, of different value in responding to tests that assay limited types of abilities relevant to standard norms. Unfortunately, neither the cultural deficit or the cultural difference model has produced empirical evidence that accounts for the attenuation in predictive validity coefficients between early intelligence test performance and intellectual achievement following intervention.

A third, simple and, thus far, poorly articulated view is that early performance on the Stanford-Binet (and/or other cognitive tests) performance reflects not only what the child might know, but also the type of learning environment he has had, has and is likely to have in the future. The Stanford-Binet instrument may have

fulfilled (serendipitously) not one, but two unintended purposes beyond prediction of scholastic success, first as a measure of "intelligence" and second as an indirect index of environmental processes that provide the ground or context against which individual cognitive development can be explained to some extent. Thus far, we have had glimpses of how environment covaries with individual test performance in very general terms (Skodak and Skeels, 1964; Scarr, 1973, Moore, 1984).

In accounting for the aforementioned instances of poor predictive validity of intelligence tests, the present approach would note that a favorable normative environment was provided through intervention, hence, the early I.Q. gains. Yet, once disadvantaged children were returned to the unfavorable conditions that are inherent in impoverished, uneducated, marginal cultures, those gains were apt to disappear. The point here is that the predictive validity of intelligence tests may depend on the stability of the socio-cognitive environment (at measurement times). Cognitive test performance may thus serve as an index of latent and concurrent environmental conditions related to learning from this perspective.

Evidence that the quality of external support for cognitive development is highly and consistently related to intellectual performance continues to grow (Carew, 1980; Clarke, 1984; Clarke-Stewart, 1979; Scott-Jones, 1984). In particular, mothers' behavior represents the best single predictor of young children's

test performance (Hess & Shipman, 1969; Goodson & Hess, 1976; Moore, 1984). Mothers' interaction style also represents a substantial source of environmental influence on children in general. Yet, relatively little is known about parent-child interactions with school-aged children from an ecologically valid perspective.

Schweinhart and Weikart (1981), like others in the Consortium of Longitudinal Studies (Lazar and Darlington, 1982), have found evidence of improved adaptive functioning for program participants in school in the absence (or disappearance) of I.Q. gains. These authors note,

> ". . . school achievement, particularly at eighth grade, cannot be affected directly by preschool experience - a mediating variable is logically necessary. It might be expected that I.Q. would be this mediating variable; apparently it is not."

Unfortunately, a dearth of research on other measurable mediating variables now exists, particularly with regard to the environmental processes of comparable populations in intervention follow-up evaluations.

Critical questions in this research area have been raised by Bower, (1977); Lazar et. al, (1977); McCall, (1977), and others concerning the explanation of discontinuities in development, a topic which until recently was the exception rather than the rule. Clarke-Stewart (1973), for example, considers that

> ". . . the role of intervention research ought to be experimental manipulation of maternal interactive styles so as

to determine conclusively whether changes in parental behavior result in changes in child behavior" (in Slaughter, 1983).

The present study is based on the follow-up of a small, intensive, early-age intervention. It employs relatively small samples of low SES program participants and controls (of both low and middle socio-economic status) to explore the interrelationships among early intellectual performance and subsequent school achievement and mother-child interaction style. Cultural and gender differences are also considered. Outside of the tentative nature inherent in studies with small samples, the present report seeks to fill an important gap in developmental research.

Two general sets of questions are addressed in the study, although its purpose is primarily descriptive. The first set employs the total sample (N = 54) in exploring the relative contribution of early intelligence test performance (Stanford-Binet and Bayley Scale scores), and parent-child interaction style as indices of children's past and present environments for predicting scholastic performance prior to the consideration of SES, race and sex effects. The rationale for this strategy is that early Stanford-Binet (S-B) performance may reflect both intraindividual aptitude and environmental factors present at that time.

Hypotheses

If the environment has remained stable over time, we may expect significant correlations between S-B and a subsequent index of family environment (via observations of parent-child interaction).

The parent-child interaction style measure represents participatory, ongoing interaction processes in the family and is predicted to be more highly associated with current school performance than early test scores. Secondly, early intelligence test scores are predicted to correlate significantly with later parent-child interaction, particularly in stable family environments. The degree of association between S-B performance and the interaction style measure should be significant to the extent that each reflects environmental processes related to learning and thus be largely collinear in predicting achievement.

To explore possible lasting effects of intervention, predictive equations for achievement measures are examined separately for experimentals and controls. For example, do the general patterns of intercorrelations between school achievement measures and the predictor measures vary significantly depending on early intervention, sex, culture and SES? The aim here is to discover possible differential patterns according to subject characteristics that may be relevant to the intervention and developmental literature. It may be that the predictive power of early test performance and/or the effects of intervention differ, depending on sex, ethnicity and social class, when scholastic achievement is considered. The null hypothesis is that school achievement outcomes should be predicted equally well by early intelligence test scores and parent child interaction style among the present three groups, after controlling for sex and race.

Method

The study employs a sample of 54 mother-child dyads that were identified from birth at the time Project Know-How (Dunham, 1966), an early childhood intervention program, began operation in 1967. At the time, 60 low SES families, in groups of 30, were randomly assigned to treatment and control conditions. Four experimentals dropped out of the programs. An additional upper middle SES control group (n = 30) was also identified at the time using Hollingshead and Redlich (1958) scale values. Each of the three experimental conditions was composed of equal numbers of black and white families. The low SES families were intact, with a healthy child of one year of age and their socio-economic status fell at scale values six and seven, using Hollingshead-Redlich criteria. Children from the three groups were administered the Bayley Scales at age two and the Stanford-Binet after age three and were not found to be significantly different in their performance.

The intervention sought to maintain a normal rate of development for the experimental group by involving children from ages two to four in the following program:

1. The target children participated four hours a day, five days a week in a DARCEE program for two years.
2. Their mothers were trained in health, nutrition, communication and child development skills and subsequently hired to work in the project with other children.

3. The program also employed trained staff to stimulate the child through verbalization and concept development activities (Palmer method, 1976) and trained mothers to employ verbal skills, praise and encouragement in teaching and rearing their children at home.
4. Vocational guidance and support was provided for father in an effort to maintain stability in the home.

The present sample consists of 19 (of 26) experimental, 18 (of 30) low SES and 17 (of 30) middle SES control dyads that were located near Tallahassee, Florida. The children were between the ages of 12 and 13 at the time of follow-up. Attrition was around 33 percent across groups with slightly more middle SES families moving away from the county. Three black middle SES and two low SES control families refused to take part in the present study. Preliminary examination of school records suggests that history may underestimate treatment effects on intellectual performance. Seven out of 18 students in the low SES group, as opposed to two out of 19 students in the experimental group, participated in Title I programs, something that is consistent with the intervention literature and which is significant using a Chi-square test ($p < .001$). There are approximately equal numbers of males and females in the sample (25 vs. 29) although there is a larger male to female ratio (12/7) in the experimental group than in the other two control

groups (7/11 low, 6/11 middle SES respectively). The racial composition for each group is as follows: low SES experimental (9 white, 10 black), low SES control (8 white, 10 black), middle SES control (8 white, 9 black). Approximately 50 percent of the families are still intact in each group. The mothers' ages range from 31 to 45 years of age. The children were all attending schools locally at the time of the study. The present subsample was found comparable to the initial sample in terms of the fathers' occupation and mothers' education. Twenty-five percent of experimentals were found living in single parent homes, compared to 33 percent for the low and 11 percent for the middle SES controls.

Measures

Data on the children's school performance was collected concurrently with the interviews. This data set consisted of the students' performance on the California Test of Basic Skills (CTBS). It provided data on reading, language, math, total battery and reference skills. Bayley Scale scores at age 2 1/2 were available for 17 experimentals, 16 low SES and 17 middle SES controls. The Stanford-Binet was administered between ages 3 and 4 to 16 experimentals, 13 low SES and 16 middle SES controls.

Description of the Parent-Child Interaction Style Measure

Measures were derived from a mother-child interaction interview ten years after early intervention to examine parental verbal regulation and childrearing patterns, as well as the child's ability to participate verbally in public situations. The latter were

considered important in determining the child's social competence and ability to profit from educationally relevant situations in general. Because of our concern regarding ecological validity in the assessment of familial processes, we decided to forgo the use of traditional instruments, most of which were unsuitable or potentially threatening for this sample. The interviews were conducted in the families' homes by the experimenter and an assistant. The following instructions were read to the mother and child by the experimenter in order to avoid response bias due to differences in reading level:

> Mrs. _____ and _____, I'm going to show you some cards and read them to you. On these cards are some problem situations that could occur in your family. I would like one of you to tell the other how you would solve the problem and then the other person tell how they would solve the problem. When you have both given your solution, I would like you to discuss the problem together and decide on a solution that both of you agree on. I would like you to try to speak to each other and to try to ignore us. Do you have any questions?"

The measures were divided into two response categories that reflect various aspects of parent-child interaction. The first one consisted of behaviors (scored for mother and child separately) such as; frequency of successful and unsuccessful interruptions by mother or child; speech duration total for the mother and child; questions asked by mother or child and others (See Dunham et al 1985).

The second response set is based on a revision of childrearing measures developed by Jackson (1956) that assessed the parent's disciplinary style. A high score on the Jackson measure was associated with maternal acceptance, explanation and use of natural consequences. A negative score reflected the use of deprivation, assertion of authority and punishment by the parent. A more extensive discussion of the interaction style measure is available from other reports (Dunham, Portes, & Williams, 1984; Portes, et al 1985). For our present purposes, the reliability of the process measures used to index mother-child interaction style and a description of the latter are provided along with the data collection procedure.

Reliability

The reliability for the measures in the first response category was estimated by using Pearson correlations computed from the judgments of two independent raters. The averaged reliability for these measures was .89.

The reliabilities for the Jackson measures was calculated by dividing the number of inter-rater agreements by the number of agreements and disagreements. Two trained judges, working together, examined each interaction and identified maternal statements that were scoreable under the Jackson scale and assigned them to the appropriate category. After a training period, a second group of raters examined the interactions of a subset of eighteen families that were representative of the whole sample in terms of

described subsequently: the child attempts and often succeeds in interrupting the discussion (.74 & .65 respectively); the child's speech duration is long (.64) and he is likely to ask questions (.60) during the discussion of hypothetical problems; the mother also attempts and succeeds in interrupting the child (.55 of .58 respectively). Both mother and child make reference to democratic disciplinary practices in the home characterized by acceptance, explanation and the use of natural consequences as opposed to more punitive measures (.53). In this pattern of parent-child interaction, the mother's speech duration (.41) also appears less central than the child's (.64), indicating possibly independence and reciprocity. The mother's questioning behavior was of least consequence on the PSI factor (.35).

Results

Scores based on the PSI factor were derived for each mother-child dyad and used in subsequent analyses as an index of communication processes in the home. Means and standard deviations for the PSI variable, Stanford-Binet, Bayley and school performance scores are shown in Table 2 broken down by experimental condition, sex, and race.

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Insert Table 2 about here

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In order to examine differential predictive patterns for each of five school achievement outcomes, two regression analysis strategies

experimental condition and race. Their scoring was independent of that of the first group of judges. Several measures had low reliabilities due, in part, to very low base rates (e.g., response frequencies of one or two). The average reliability for the Jackson categories was .76 before they were factor-analyzed to produce one general measure. The estimated reliability for all interaction measures in the study is .87.

Several interaction measures (including the Jackson factor) obtained from the parent-child interview were factor analyzed in attempting to capture possible underlying types of family behavior. One general factor was chosen to assess parent-child interaction which had an eigen value of 5.82, accounting for over 62 percent of the variance. Rao's canonical factoring was employed to maximize the correlation between interaction measures and the hypothesized factor and to generalize results (see Portes et al, 1984 for a more detailed description of the is section).

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Insert Table 1 about here

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Parent-Child Interaction Style

A style of parent-child communication where both members actively exchange information was reflected by the first general factor. It was named a Participatory Style of Interaction (PSI). Table 1 shows the pattern matrix for the PSI factor. The different loading pertaining to family communication characteristics are

were employed, as noted earlier. As Table 3 shows, differences in achievement were accounted for primarily by experimental condition, where the difference between the middle SES control group scores and those of the two low SES groups was significant ($p < .001$) for Total Battery, Reading Language, and Math Achievement, and to a lesser extent, in Reference Skills scores. The stepwise forward regression solution also showed that ethnicity was the strongest predictor of reading achievement and that PSI, the parent-child interaction measure, accounted for about 20 percent of the variance in Reference Skills performance. The contribution of early age test performance (on S-B and Bayley tests) was not significant for any of the achievement tests in the first model. White students performed significantly above black students ($p < .01$) overall except in math and reference skills ($p > .05$). PSI was found to explain a significant amount of variance in language achievement ($p < .05$) even after condition, sex, and race were controlled. A hierarchical decomposition of variance was employed to compute F-ratios for the squared part correlations.

The effect of intervention on achievement was tested separately by excluding the middle SES group and controlling for sex and race. No significant differences were found in any of the dependent measures and only a marginal difference favoring experimentals on language achievement ($p = .13$).

In the second regression strategy, the contribution of early age test performance and concurrent mother-child interaction style were

examined before that of the demographic measures. Table 3 also shows the variance accounted for in each of the achievement tests using the second model where the contribution of contextual factors is examined last. The PSI measure (an index of mother-child interaction style) accounts for the majority of the variance in all measures of scholastic achievement. Note how the variance attributable to demographic factors in the past is explained primarily by a measure of one aspect of students' home environment. The contribution of early test performance is not significant for any of the outcomes. As Table 3 and 4 show, the proportion of variance in achievement generally accounted for by the Stanford-Binet is approximately less than half, in most cases, than would have been the case if it had been entered first ($r = .30$). It is noteworthy that the contribution of sex in language achievement increases significantly in the second model (Table 3) after dyadic interaction style is controlled, in spite of a simple correlation of .29. This may be due to the fact that girls, who tend to score higher in language tests in general, were found to be less participatory than boys in the present case.

The variance accounted for in achievement generally by racial differences is reduced dramatically after parent-child interaction is controlled. The only exception is found in the language battery ($F, 1, 47 = 6.6, p > .05$).

In Table 4, simple correlations are shown by experimental condition. Sex was coded males = 1, females = 2, and race was coded

1 = white, 2 = black. As may be noted, females tended to be less participatory in interaction with their mother (PSI) except in the treated group (n = 7). Girls also tended to score higher on the Stanford-Binet in the experimental group than boys, but not in the middle SES group (n = 11). Females in the experimental group tended to have higher achievement scores relative to males but no such pattern was evidenced in the control groups except for reference skills in the middle SES group.

Race was associated with early test performance, except in the intervention group. Performance in the Stanford-Binet in preschool was associated with interaction style in the home for middle SES subjects and to a lesser degree for experimentals. Yet, the PSI measure correlated highly with scholastic performance particularly for experimentals. Bayley test performance predicted subsequent S-B performance to a substantial extent except for experimentals. This may be due to the fact that experimentals, who were administered the Bayley Scales in the beginning of the project and the Stanford-Binet in the second half of the intervention, experienced a change of environment during that period. A decrease in S-B performance for experimentals (n = 16) relative to low SES controls (n = 13) was noted during this time period, possibly due to differences in sex ratios within groups and attrition. Finally, note the moderately high correlation between S-B performance and school achievement generally for experimentals, which follows a pattern similar to that found for the PSI variable.

The last set of results serve to explore differential patterns in equations (via forward stepwise regression) for school achievement by experimental condition. In terms of variance accounted for by the study's predictors, experimentals' total battery achievement was accounted for by the PSI variable (28%), sex (20%), S-B (4%), race (3%) and Bayley (1%). For the low SES control group, the R^2's were: Race (39%), sex (2%), PSI (2%), S-B (1%) and Bayley (4%). For the middle SES controls: race 3 percent, Bayley, PSI and sex less than 1%.

Discussion

The study's findings serve to explore, at best, a set of important questions in the field and should be regarded as pilot work for when adequate resources permit replication attempts with larger samples. Due to the small sample size, attrition and other limiting factors, the study is more qualitative than quantitative in nature. The robustness of parametric techniques is tested severely in the inferences being made. Yet, it should be noted that, barring extreme cases, averages and correlation coefficients begin to stabilize around the present number of data points. Also, the data presented is unique in the literature. In fact, some of the data patterns are well within the bounds of earlier studies with the exception of the crossing of factors in the context of early intervention and the PSI measure.

These data suggest that the present early age intervention may have had a positive effect on a limited number of participants,

particularly females, a minority in the sample. However, the small sample employed does not indicate a reliable treatment effect on achievement. On the basis of S-B and PSI scores, it appears that intervention may have "normalized" the family environment in some cases to the point where those responding to treatment originally did well in school and vice versa.

Possibly due to a "disadvantageous" sex ratio, small sample, attrition and/or other intervention shortcomings, the slight edge of experimentals over low SES controls was not of significance. Yet, intervention appears to have contributed towards a stable, responsive environment as reflected by the higher correlations among I.Q., PSI and school achievement relative to controls. The presence of an upper-middle class control group limits the number of speculations that can be made based on the data. The lack of association between early test performance and school achievement in that group suggests that it may not be representative of the norming samples in the Stanford-Binet, possibly due to cultural differences. The correlation between PSI and S-B in that group, however, suggests stability in a cognitively advantageous environment. Yet, a participatory style of interaction may be regarded important for the intellectual development of low SES children but may not be as important for middle SES ones. The finding that a responsive style of interaction is not predictive of school performance in the control groups is puzzling. The low SES group, with an average PSI score of 1/2 a standard deviation below

the norm, shows little variability. This may reduce the magnitude of association between PSI and achievement measures for low SES children although sex differences account for this trend suggesting, that intervention may have served to narrow the gender gap on this dimension.

Future ecological assessments of family interaction styles related to achievement are needed with larger samples to examine gender and cultural differences. In sum, scholastic achievement appears to be predicted differentially by measures of early cognitive performance and concurrent interaction style, depending on the populations from which samples are drawn, sex and ethnicity. Early intervention appears to be associated with a positive trend in interaction style and scholastic achievement, particulary for females, and to a lesser extent, black males. However, statistical significance was not evidenced for any of the above, given the present, large margin for type II error. Future early age intervention evaluations should be sensitive to potential effects on family processes that may serve to mediate other outcomes, while at the same time, being subject to sex and socio-cultural influences.

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TABLE 1

Factor (Pattern) Loadings for

Participatory Style of Interaction (PSI)

TEST	PSI FACTOR
Unsuccessful Interruptions by child	.72
Successful Interruptions by child	.65
Speech Duration by child	.64
Questions by child	.60
Successful Interruption by mother	.58
Unsuccessful Interruptions by mother	.55
Jackson Measure (childrearing methods)	.53
Addition of Information by mother	.51
Simultaneous Speech, mother prevails	.47
Speech Duration by mother	.41
Questions by mother	.35

TABLE 2

Means and Standard Deviation for Study's Measures by Experimental Condition, Sex and Race*

		Bayley		S-B		PSI		Total B		Reading		Language		Math		Reference Skills	
	n	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD
Low SES Treated	19	116.0	24.3	99.5	12.0	-1.0	81.0	34.2	25.6	35.3	26.7	36.4	22.5	35.3	26.3	42.5	31.1
Male	12	116.5	24.0	96.4	13.0	-9.0	70.0	24.2	19.3	25.5	23.9	26.0	18.2	31.0	21.8	39.3	27.6
White	4	106.5	13.9	89.0	15.0	-5.0	61.0	31.2	15.1	40.0	29.4	35.0	9.2	27.2	18.6	49.5	31.0
Black	8	118.2	31.6	99.2	12.0	-11.0	79.0	20.7	21.1	18.2	18.7	21.6	20.4	33.0	24.3	34.2	26.5
Female	7	121.4	22.8	106.0	7.0	12.0	100.0	51.2	27.2	52.1	23.9	54.1	18.3	42.5	33.0	48.1	38.1
White	5	128.6	20.8	106.0	7.0	48.0	96.0	57.2	26.6	60.6	20.8	61.0	13.05	47.2	37.7	53.0	40.3
Black	2	125.0	21.2	-	-	-78.0	20.0	36.5	31.8	31.0	21.2	37.0	22.6	31.0	24.0	36.0	42.4
Low SES Control	18	101.8	18.4	102.0	22.0	-50.0	61.0	30.1	19.4	33.1	22.9	31.4	18.09	33.0	21.6	36.7	27.2
Male	7	102.0	18.6	101.0	27.0	-1.0	74.0	29.4	23.9	34.5	27.7	27.1	20.4	28.1	18.8	33.4	28.0
White	4	108.3	18.3	121.0	25.0	44.0	64.0	44.0	19.7	51.2	21.4	40.0	16.4	40.0	14.6	38.2	31.0
Black	3	91.3	13.6	82.0	11.0	-63.0	18.0	10.0	12.1	12.3	17.8	10.0	8.6	12.3	9.2	27.0	22.5
Female	11	102.4	20.0	102.0	21.0	-79.0	24.0	30.5	17.2	32.1	20.7	34.1	16.8	36.1	23.6	38.9	27.8
White	4	98.7	18.6	111.0	31.0	-79.0	32.0	42.7	13.4	52.2	15.69	45.2	11.7	49.0	29.2	48.5	35.7
Black	7	104.5	22.3	98.5	16.0	-79.0	21.0	23.5	15.8	20.7	13.0	27.8	16.6	28.8	18.2	33.4	23.5
Middle SES Control	17	114.3	18.7	111.0	14.0	53.0	102.0	63.3	27.0	62.9	25.8	63.2	20.8	60.7	29.4	65.8	23.8
Male	6	119.3	20.7	119.0	12.0	135.0	90.0	68.1	22.6	75.0	17.9	63.6	17.5	61.5	27.0	80.1	12.0
White	5	125.2	15.7	122.0	11.0	130.0	100.0	65.8	24.4	72.4	18.7	61.0	18.2	61.0	30.2	83.8	9.0
Black	1	90.0	0.0	107.0	0.0	160.0	0.0	80.0	0.0	88.0	0.0	77.0	0.0	64.0	0.0	62.0	0.0
Female	11	111.6	18.3	107.0	14.0	9.0	81.0	60.7	29.8	56.3	27.8	63.0	23.2	60.2	31.9	58.0	25.3
White	3	114.3	3.2	119.0	11.0	126.0	17.0	72.6	40.5	67.3	35.9	78.0	32.9	71.3	43.6	66.0	33.1
Black	8	110.6	21.8	103.0	13.0	-35.0	35.0	56.2	26.7	52.5	25.8	57.3	18.1	56.1	29.0	55.0	23.8
TOTAL	54	111.1	21.7	104.0	17.0	0.0	91.0	42.0	24.2	43.2	25.2	43.2	20.6	42.5	25.9	47.9	27.7

*Note: Scores for two cases were missing in each of the two low SES groups for Bayley computations. S-B scores for three cases in the experimental, five in the low SES control and one in the middle SES control groups were missing. Race and sex characteristics for those missing in the Stanford-Binet are respectively: (Exp) 1 white male, both black females, (L) 2 white males, 1 white female, 1 black male, 1 black female; (M) 1 white male.

TABLE 3

Proportions of Variance Explained in Achievement Tests

by Bayley, S-B, PSI Scores and Contition, Sex and Race

Dependent Measure	Model I	R^2	Model II	R^2
	Condition	.27*	PSI	.20*
	Race	.11*	SB	.03
Total	Sex	.02	Bayley	.00
Battery	PSI	.03	Condition	.11
Achievement	Bayley	.00	Sex	.04
	SB	.00	Race	.03
	Total	.45	Total	.45
	Race	.22*	PSI	.21*
	Condition	.22*	SB	.04
Reading	Sex	.00	Bayley	.00
Achievement	PSI	.01	Condition	.08*
	SB	.00	Race	.11*
	Bayley	.00	Sex	.01
	Total	.47	Total	.47

TABLE 3 (continued)

Proportions of Variance Explained in Achievement Tests

by Bayley, S-B, PSI Scores and Contition, Sex and Race

Dependent Measure	Model I	R^2	Model II	R^2
	Condition	.31*	PSI	.22*
	Race	.13*	SB	.00
Language	Sex	.06	Bayley	.00
Achievement	PSI	.01	Sex	.19*
	SB	.01	SES	.08*
	Bayley	.00	Race	.06*
	Total	.58	Total	.58
	Condition	.19*	PSI	.12*
	Race	.04	SB	.03
	Bayley	.02	Bayley	.00
Math	Sex	.01	Condition	.09*
Achievement	PSI	.02	Sex	.02
	SB	.00	Race	.00
	Total	.29	Total	.29

TABLE 3 (continued)

Proportions of Variance Explained in Achievement Tests

by Bayley, S-B, PSI Scores and Contition, Sex and Race

Dependent Measure	Model I	R^2	Model II	R^2
	PSI	.19*	PSI	.19
	Condition	.06	SB	.05
Reference	Bayley	.04	Bayley	.01
Skills	Race	.01	Condition	.05
	SB	.00	Race	.01
	Sex	.00	Sex	.00
	Total	.32	Total	.32

TABLE 4

Intercorrelations Among Predictor Variables

by Experimental Condition

		Sex	Race	PSI	SB	Bayley
		-.37				
Race		.20				
		.53				
		.10				
	E	.13	-.31			
PSI	L	-.63*	-.47*			
	M	-.60*	-.71**			
	Total	-.28*	-.45**			
	E	.38	.38	.21		
SB	L	.03	-.47	.01		
	M	-.39	-.62**	.58**		
	Total	.07	-.35**	.32*		
	E	.14	.20	.13	.28	
Bayley	L	.04	-.09	.24	.56**	
	M	.20	-.35	.31	.61**	
	Total	.03	.14	.28	.40**	
	E	.49*	.58**	.44*	.34	.34
Reading	L	-.05	-.01	.33	.20	-.03
	M	-.35	-.28	.26	.26	-.20
	Total	.11	-.47**	.46**	.35	.24
	E	.61**	-.56**	.60**	.30	.23
Language	L	.19	-.56**	.18	.12	.16
	M	-.01	-.19	.10	-.12	.11
	Total	.29*	-.37**	.47**	.23	.18
	E	.21	-.11	.43	.55*	.47*
Math	L	.18	-.48*	.23	.14	.18
	M	-.02	-.13	.01	.02	.01
	Total	.16	-.20	.35**	.29*	.27*

TABLE 4 (Continued)

Intercorrelations Among Predictor Variables

by Experimental Condition

		Sex	Race	PSI	SB	Bayley
Battery	E	.52	-.43	.53*	.45	.36
	L	.02	-.62**	.30	.19	.16
	M	-.13	-.18	.12	.08	.07
	Total	.19	-.34**	.45**	.32**	.26
Reference Skills	E	.10	.14	.45*	.29	.22
	L	.10	.22	.05	.14	.11
	M	-.45	-.46	.37	.53*	.60**
	Total	.01	.28	.43**	.36**	.31**

**p .01
*p .05